REMARKS

This is in response to the Office Action that was mailed on December 3, 2004. Applicant gratefully acknowledges a personal interview with Examiners Siew and Yaen on 16 March 2005. The substance of the interview is reflected in this Amendment. Claims 9-12, 16, 17, 19, and 28 are amended in accordance with the disclosure to more clearly differentiate the present invention over the disclosure of Nagase et al. Claim 12 is further amended to clarify the peptides to which the claimed peptides are functially equivalent. No new matter is introduced by this Amendment. Claims 9-12, 16, 17, 19, 20, 28, and 29 are pending in the application.

Rejection under 35 U.S.C. §112, first paragraph

Claims 9, 10, 17, 19, 20, 28, and 29 were rejected under 35 U.S.C. § 112, first paragraph, as being based upon a specification that allegedly lacked a proper written description of the inventions claimed. Office Action, page 3-5. Examiners Siew and Yaen kindly indicated that the claims as amended herein are not subject to this ground of rejection.

Rejection under 35 U.S.C. § 102

Claims 9-12, 17, 19, 20, 28, and 29 were rejected under 35

U.S.C. § 102(b) as allegedly being anticipated by Nagase et al. The rejection is respectfully traversed.

Examiners Siew and Yaen kindly indicated that claims 9 and 10 as currently amended are allowable over the Nagase et al. reference. During the interview, the Examiners initially indicated claims 11, 12, 16, 17, 19, 20, 28, and 29 were not allowable over Nagase et al.

Claim 11 is the broadest of the claims in question. The Examiners understood that the clause "consisting of 8 to 14 amino acids" was added to the preamble of claim 11 in order to overcome the rejection over Nagase et al. However, the Examiners argued that the rejection was not overcome because claim 11 recites open language ("which comprises") in the first line of the body of the claim. The Examiners argued that this language re-opened the scope of the claims such that Nagase et al. was still applicable. It was pointed out that the "comprising" language is necessary to encompass, for instance, a 14-mer peptide wherein 4 amino acids are added to either end of SEQ ID NO: 3. It was also pointed out that the language "consisting of 8 to 14 amino acids" placed a limit on the number of amino acids, so that the entire sequence of SEQ ID NO: 1 is not encompassed by the claims (and therefore not anticipated by Nagase et al.). Applicants believe that none of the claims currently pending in the application is anticipated by the Nagase et al. reference.

Possible issues of written description and/or enablement

During the interview, it was suggested that claim 11 may be rejectable for lack of written description and/or insufficient enablement. It was argued that the addition of *any* amino acid to SEQ ID NOs: 3-18 might either not be described in sufficient detail in the specification or might require undue experimentation of the skilled artisan.

With regard to the first assertion (written description), it is pointed out that the specification herein discloses a sufficient number of examples of peptides of 8 to 14 amino acids in length. For instance, SEQ ID NO: 7 contains all the amino acids of SEQ ID NO: 6 but adds two amino acids to one end thereof. The phrase "peptide of 8 to 14 amino acids" herein describes a tumor antigen peptide that binds to an HLA antigen and is recognized by cytotoxic T lymphocytes. The present invention is based, in part, on the finding that the protein shown in SEQ ID NO: 1 (ART-1) - the function of which was previously unknown - is a tumor antigen protein which gives rise to tumor antigen peptides via intracellular processing. It is known in the art that the process for determining *whether* a given protein is a tumor antigen protein is difficult. However, once a protein is found to be a tumor antigen protein, methods for identifying and preparing tumor

antigen peptides from the tumor antigen protein are well known in the art and within the skill of the average artisan.

As evidence thereof, Applicant refers to Rammensee et al., *Immunogenetics,* 41:178-228, 1995, which is mentioned on page 21 of the specification. A copy thereof was attached to the Amendment filed on September 1, 2004 as Exhibit 1. Rammensee et al. provides a compendium of MHC peptide motifs and MHC ligands known in 1995, as well as a discussion of methods used to determine binding motifs and ligands. Further, Table 1 on page 21 of the specification contains the binding motifs necessary for peptides to bind HLA antigens. The specification also provides Examples that demonstrate that some of the "peptides of 8 to 14 amino acids in length" according to the present invention function as tumor antigen peptides (See Examples 4 to 9).

Therefore, given the disclosure of the specification as well as knowledge in the art, the "peptides of 8-14 amino acids" falling within the scope of the instant claims can be readily envisioned and prepared by those skilled in the art. Accordingly, the instant claims fully comply with the written description requirement of the first paragraph of 35 U.S.C. § 112.

With regard to the second assertion (enablement), it is routine in the art to create small peptides of 8 to 14 amino acids. Moreover, the addition or deletion of amino acids from a peptide is

routine in the art. Again, peptide motifs providing binding to various HLA antigens are known in the art. As yet further evidence thereof, Applicant refers to Exhibit 2, Parkhurst et al., *The Journal of Immunology,* 157:2539-2548, 1996. Parkhurst et al. disclose, on page 2539-2540, "… for HLA-A*020|, leucine (L) and methionine (M) are most frequently isolated at the second position from the amino terminus (P2), and valine (V) is predominant at P9. … In previous studies using peptides from viral Ags, amino acid substitutions at primary and secondary class I MHC-binding anchor positions enhanced the immunogenicity of peptides against the native protein …. … In the current study, single and double amino acid substitutions were introduced into the three common epitopes …." Manifestly, amino acid substitution in HLA binding peptides is routine in immunology, and does not involve "undue" experimentation. Accordingly, the instant claims fully comply with the enablement requirement of the first paragraph of 35 U.S.C. §112.

Election/Restriction

Applicants respectfully request that the Examiner rejoin claim 16 to the examined claims. Claim 16, as amended, is directed to peptides shown in any one of SEQ ID NOs: 19-21, which are specific embodiments of "an isolated tumor antigen peptide which comprises a

sequence selected from an amino acid sequence shown in any one of SEQ ID NOs: 3-5 wherein the amino acid residue at position 2 is substituted by tyrosine, phenylalanine, methionine, or tryptophan, and/or the C-terminus is substituted by phenylalanine, leucine, isoleucine, tryptophan, or methionine, and which has the functionally equivalent properties" as defined in claim 12. Accordingly, inasmuch as claim 12 is allowable as discussed above, claim 16 should be rejoined and likewise allowed in this application.

Conclusion

Applicants respectfully submit that the above amendments and Remarks fully address and overcome the rejections of record. It is respectfully submitted that the present application is in condition for allowance. The Examiner is respectfully requested to issue a Notice of Allowance indicating that claims 9-12, 16, 17, 19, 20, 28, and 29 are allowed.

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact Richard Gallagher (Reg. No. 28,781) at the telephone number of the undersigned below, to conduct an interview

in an effort to expedite prosecution in connection with the present application.

Pursuant to 37 C.F.R. §§ 1.17 and 1.136(a), Applicant(s) respectfully petition(s) for a one (1) month extension of time for filing a reply in connection with the present application, and the required fee of $120.00 is attached hereto.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. §§ 1.16 or 1.17; particularly, extension of time fees.

Respectfully submitted,

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Attachment: Parkhurst et al. article.